

ANNUAL PROJECT SUMMARY

MID-AMERICA INTEGRATED SEISMIC NETWORK - UKY

January 1 – September 30, 2004

Award Number: 04HQAG0013

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This project is part of the Mid-America Integrated Seismic Network (MAISN), a cooperative effort between the University of Memphis (CERI), St. Louis University, Virginia Tech, the University of South Carolina at Columbia, the University of Kentucky (UK), and the U.S. Geological Survey. The purposes of the MAISN are twofold:

1. to provide scientists, engineers, public and private entities, emergency responders, and the media with rapid and reliable information about felt and damaging earthquakes within a timeframe that maximizes the utility of the information.
2. to provide high quality data on a timely basis to the scientific and engineering communities for the purpose of improving:
 - a) seismic hazard estimation for urban population centers and the lifelines and critical facilities upon which they depend
 - b) estimation and measurement of strong ground motions
 - c) our understanding of the basic earthquake process and seismotectonics of earthquake zones, particularly in intraplate regions.

The University of Kentucky components of MAISN are:

- 1) to enhance operation and maintenance of the Kentucky Seismic and Strong Motion Network (KSSMN);
- 2) to enhance the data sharing with CERI, NEIC, and USGS NSMP in real-time and other methods;
- 3) to better provide earthquake information for all Kentuckian and other stake holders.

Currently, KSSMN consists of 18 short-period stations and 10 strong-motion stations (Fig. 1). The short-period network includes 11 permanent single-channel (L-4C sensor) and 7 temporary 1- and 3-channel stations (L-4C and L-28). The signals from the permanent seismic stations, BHKY, FLKY, FMKY, LLKY, LOKY, MOKY, PAKY, PKKY, ROKY, SMKY, and SOKY, are transmitted to the University of Kentucky campus in Lexington, Kentucky through the Kentucky Emergency Warning System (KEWS) and digitized and recorded on a NetDAS 64 Channels System. The hilocoder displays of the 11 permanent seismic stations are generated by Earthworm and posed on

<http://www.uky.edu/KGS/geologichazards/quake3.htm>.

The waveforms from the 11 permanent stations are being delivered in real time to CERI through the Earthworm mechanism.

Kentucky Seismic and Strong Motion Network

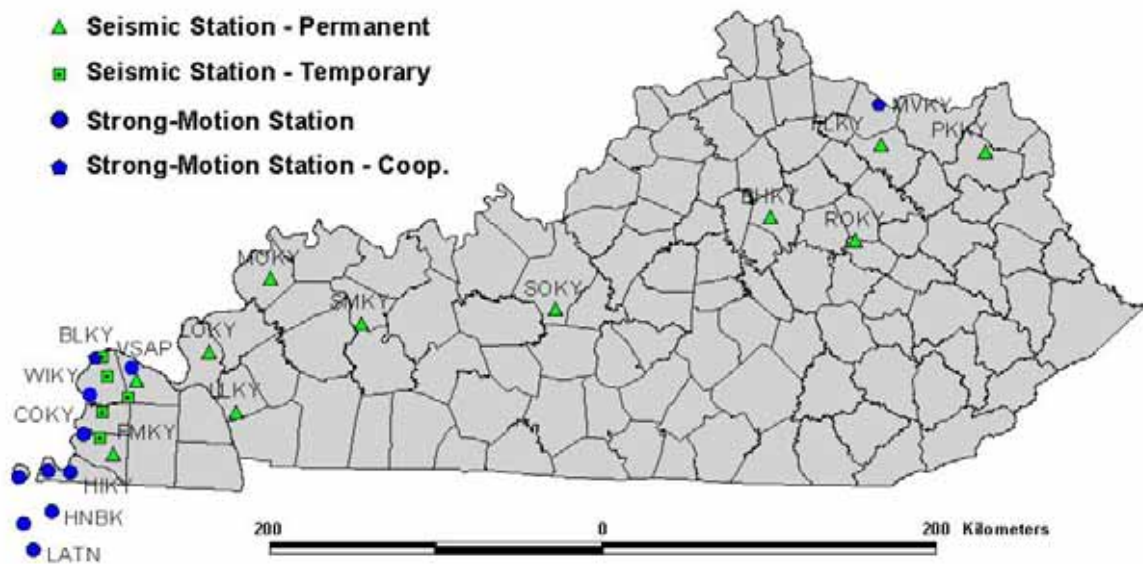


Figure 1. Kentucky Seismic and Strong Motion Network (KSSMN).

Between January 1 and September 30, 2004, station PAKY was restored and added to real-time data delivering to CERI. Two stations, FMKY and PAKY, were calibrated. The polarities (vertical) of all seismic stations were also calibrated.

There are many mining activities in Kentucky and its neighboring states. Distinguishing small earthquakes from mine blasts is a vexing problem. Figure 2 shows the typical mining blasts recorded at station ROKY in eastern Kentucky. A small earthquake (Md 2.0), occurred at 19:10:11UTC on September 23, 2004, was recorded during the period of mining activity (Fig. 2). The regional (CERI) and National (NEIC) networks may not pick up the event.

The strong motion network includes two cooperative stations (Fig. 1), one of which is ANSS station (MVKY). UK pays the internet access for the real-time data transmitting from station MYKY to CERI. The UK strong-motion stations are installed in the remote area of central and northern New Madrid seismic zone (Fig. 1) and accessed through dia-up telephone lines. It is quite often that many of the strong-motion stations are not accessible due to poor quality of the phone-lines in the area. A strong motion (K2) station has been planned for Kentucky Geological Survey's Henderson office in Henderson, Kentucky. The equipment for the station has been purchased. A minimum amount of support will be requested to build the station in Henderson into ANSS station.

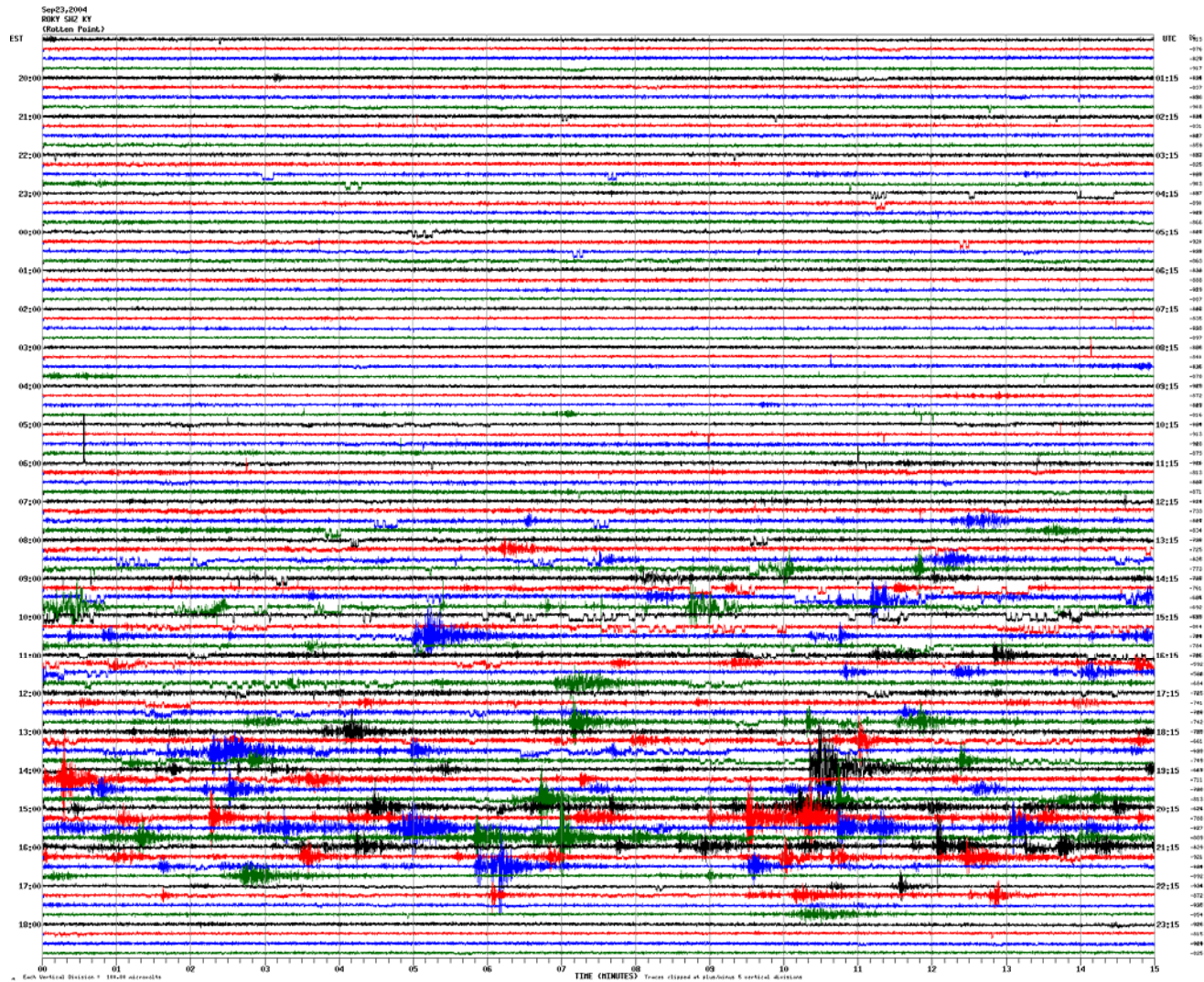


Figure 2. A typical mining activities recorded at station ROKY in eastern Kentucky. A small earthquake (Md2.0) occurred at 19:10:11 UTC on September 23, 2004.

NONTECHNICAL SUMMARY

This project is part of the Mid-America Integrated Seismic Network (MAISN), a cooperative effort between the University of Memphis (CERI), St. Louis University, Virginia Tech, the University of South Carolina at Columbia, the University of Kentucky (UK), and the U.S. Geological Survey. The University of Kentucky components of MAISN are 1) to enhance operation and maintenance of the Kentucky Seismic and Strong Motion Network (KSSMN); 2) to enhance the data sharing with CERI, NEIC, and USGS NSMP in real-time and other methods; 3) to better provide earthquake information for all Kentuckian and other stake holders. Currently, the University of Kentucky operates 18 short-period stations and 10 strong-motion stations. Operation and maintenance of KSSMN is important in better locating earthquakes in and around Kentucky and characterizing ground motion propagation in the New Madrid seismic zone. KSSMN is making contributions to the Advanced National Seismic System (ANSS), and will continue to make contributions.